

REMARKS

It is further noted that, notwithstanding any claim amendments made herein, Applicants' intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Claims 1-20 are all of the claims pending in the present Application. The Examiner has withdrawn claims 13-20 from consideration. For the sake of a complete response, Applicants hereby affirm the election of claims 1-12 but herein also traverse that the restriction is proper, as explained below.

Claims 1-12 are rejected under 35 USC § 112, first paragraph, because claims 1, 7, 11, and 17 are interpreted as claiming all dimensions below 100 nm. Applicants submit that the plain language meaning of the independent claims precludes an interpretation that all dimensions below 100 nm are being claimed. That is, Applicants submit that there is no "open-ended range" in these claims, as characterized by the Examiner. Applicants, therefore, request that the Examiner reconsider and withdraw this rejection.

Claims 1, 2, and 7 stand rejected under 35 USC §102(e) as anticipated by US Patent Application Publication 2002/0142252 to Ng. Claims 3, 8, 11, and 12 stand rejected under 35 USC §103(a) as unpatentable over Ng, further in view of US Patent 6,233,388 to Kim and US Patent 5,940,719 to Jang. Claims 4-6, 9, and 10 stand rejected under 35 USC §103(a) as unpatentable over Ng, further in view of Jang.

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, the present invention is directed to a method of fabricating an electronic chip on a wafer. A first mask at a predetermined lower resolution is developed on a surface of a wafer. The first mask is etched under a first set of conditions for a predetermined period to achieve a higher resolution mask. The higher resolution is below 100 nm. The first set of conditions includes an a tuning parameter to independently control said line width variation tolerance of isolated features relative to nested features

The prior art fails to teach, suggest or render obvious the etching recipe of the present invention. The advantage of this recipe is that it achieves a resolution below 100nm, while concurrently providing a parameter (RF power level, see claim 12) that allows for independently tuning for line width variations between isolated features and nested features.

Moreover, the present invention has controllably achieved dimensions considerably lower than 100nm, currently including test samples down to 40 nm.

None of the cited prior art provides a tuning parameter and none uses the recipe of the specific invention.

II. THE RESTRICTION REQUIREMENT

For a second time in the prosecution of this Application, the Examiner has imposed a restriction requirement. In this restriction requirement, the Examiner considers that the process of making and the product made categorization of the claims provides rationale to restrict the claims.

Applicants agree that the categories are indeed patentably distinct but disagree that restriction is proper in this case for the two following reasons, both of which are based on the concept that restriction is proper only if there is an undue burden on the Examiner.

First, there can be no undue burden on the Examiner when the Examiner has already performed a complete search as a criterion for the Office Action dated May 21, 2003.

Second, there can be no undue burden on the Examiner when a search is performed for a method of making set of claims versus the product resultant from that method. That is, if there is no prior art found for the method, it would be difficult for the Examiner to declare that an additional burden is imposed for searching for the product made by that method.

III. THE PRIOR ART REJECTIONS

The Examiner alleges that Ng anticipates claims 1, 2, and 7, and, when combined with Kim and Jang, renders obvious claims 3, 8, 11, and 12 and, when combined with Jang, renders obvious claims 4-6, 9, and 10.

However, a key feature of the present invention is that it achieves a dimension that is less than 100 nm, including values that are as low as 40 nm. It achieves this result by using a

tuning parameter in its first set of etching conditions to independently control a line width variation tolerance of isolated features relative to nested features. Ng fails to incorporate such a tuning parameter.

In Paragraph 18 on page 7 of the Office Action dated September 29, 2003, the Examiner states: "However the Examiner believes that the teachings in Ng directed to specifically using O2 in the etching gas mixture for correcting the offset between the nested and isolated features meets this claim limitation whereby the etching gas composition is this tuning parameter."

However, Applicants submit that the prior art references must be interpreted as they would be interpreted by one of ordinary skill in the art. In this case, even the Examiner describes the "tuning parameter" as being the "etching gas composition". Applicants submit that one of ordinary skill in the art would not consider an "etching gas composition" as a "tuning parameter". In order for the Examiner to maintain this position, there would have to be described in Ng how the composition ratio is to be used as the "tuning parameter".

That is, as described in the final paragraph of page 11 of the instant Application, the RF power setting directly determines whether isolated features or nested features are more impacted by the etch. Therefore, RF power setting is indeed a "tuning parameter" that independently controls a line width variation tolerance of isolated features relative to nested features.

In contrast, the composition of the etch in Ng will not independently control a line width variation tolerance of isolated features relative to nested features. That is, Ng teaches using an oxygen etch recipe that equally etches both types of features. It does not include a parameter that tunes the nested/isolated line width variation.

Therefore, Ng does not anticipate the present invention, as one of ordinary skill in the art would interpret Ng.

Neither Kim nor Jang overcomes this basic deficiency of Ng.

Hence, turning to the clear language of the claims, there is no teaching or suggestion in Ng of: "... said first set of conditions including a tuning parameter to independently control a line width variation tolerance of isolated features relative to nested features", as required by claim 1. The remaining independent claims have similar language.

It is also pointed out that the rejection currently of record, as found in Paragraph 11 of the Office Action, does not properly reflect the claim wording. That is, the independent claims clearly contain the limitation: "... tuning parameter to independently control a line width variation tolerance of isolated features relative to nested features". The limitation is not, as the Examiner characterizes: "... corrects the nested-isolated offset...."

Therefore, the present invention is clearly patentable over Ng for this reason alone.

Relative to the combination of Ng with either Jang or Kim, Applicants submit that the Examiner relies upon a description in Ng that clearly demonstrates that etching recipes are not equal, as follows: "The O2 containing etch is chosen because it is better than other etch chemistries in correcting the offset between the nested and isolated features [0043]."

This statement, relied upon by the Examiner, clearly states that etch recipes are not interchangeable. Therefore, it would be improper for the Examiner to then adopt a contrary position in order to combine Ng with Jang or Kim.

Finally, the Examiner is understood as stating that the previous Amendment, filed July 21, 2003, fails to properly state on the record that Ng and the present Application are commonly owned.

Applicants disagree.

The following statement appeared on page 9 of that Amendment: "It is further pointed out that Ng, by reason of 35 USC §103(c), by reason of being commonly assigned, and by reason of qualifying only as a reference under 35 USC § 102(e), cannot be used as a prior art for purpose of an obviousness rejection."

Applicants submit that the above statement clearly reflects common ownership and that the latest rejection clearly reflects that the Examiner has noticed the statement. Contrary to the Examiner's characterization of MPEP §706.02(l)(2), it is the fact of the legal ownership that is significant, not the choice of wording. There are no magical words that mysteriously reflect a legal distinction that the Applicants' representative's statement concerning common assignment would be invalidated because the statement did not contain the precise wording suggested by the MPEP.

In the instant case, there is no doubt from the documents of record (e.g., the Assignment filed with the original Application on May 2, 2001) that the present Application

is assigned to "INTERNATIONAL BUSINESS MACHINES CORPORATION, a corporation of New York, having a place of business at Armonk, New York, 10504, (hereinafter called IBM)".

The front page of the Ng reference, cited by the Examiner, filed on March 29, 2001, by the same law firm that filed the present Application, also clearly reflects that Ng has been assigned to "International Business Machines Corporation, Armonk, NY (US)".

This legal status of ownership is not subject to invalidation by an Examiner's desire to have a specific set of words reflecting common ownership. In the specific case, it is a legal status that is apparent from the documents within the present Application file and cannot be disputed by the Examiner.

Because the present Application and Ng was commonly owned by IBM on the constructive invention date (e.g., the date of filing of the present invention, May 2, 2001), the Examiner has absolutely no legal basis to deny this legal status.

Therefore, Ng cannot be used as a reference in a 35 USC §103(a) rejection, a legal status that is inherent in the common ownership status of the two applications, not in the set of words preferred by an Examiner.

For the reasons stated above, the claimed invention is fully patentable over the cited references.

Further, the other prior art of record has been reviewed, but it too, even in combination with Ng, Kim, or Jang, fails to teach or suggest the claimed invention.

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

S/N 09/847,479

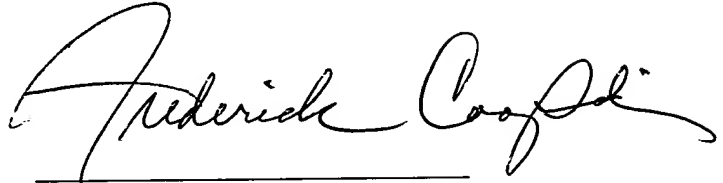
Docket: FIS920000077US1

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 09-0458.

Respectfully Submitted,

Date: _____

12/29/03

A handwritten signature in cursive script, reading "Frederick E. Cooperrider". The signature is written in dark ink and is positioned above a horizontal line.

Frederick E. Cooperrider
Reg. No. 36,769

McGinn & Gibb, PLLC
8321 Old Courthouse Road, Suite 200
Vienna, Virginia 22182
(703) 761-4100
Customer No. 21254